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Barrow Coastal Storm Damage Reduction Study

Public Meeting

April 06, 2005

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Meeting Agenda

- **Meeting Purpose**
- **Study Background**
- **Progress to Date**
- **Preliminary Measures/Impacts**
- **Planned Summer Field Studies**
- **Public Input**

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Meeting Purpose

1. **Update Community on Study Progress**
2. **Obtain Community Input On:**
   - **Preliminary Measures**
   - **Identified Possible Impacts**

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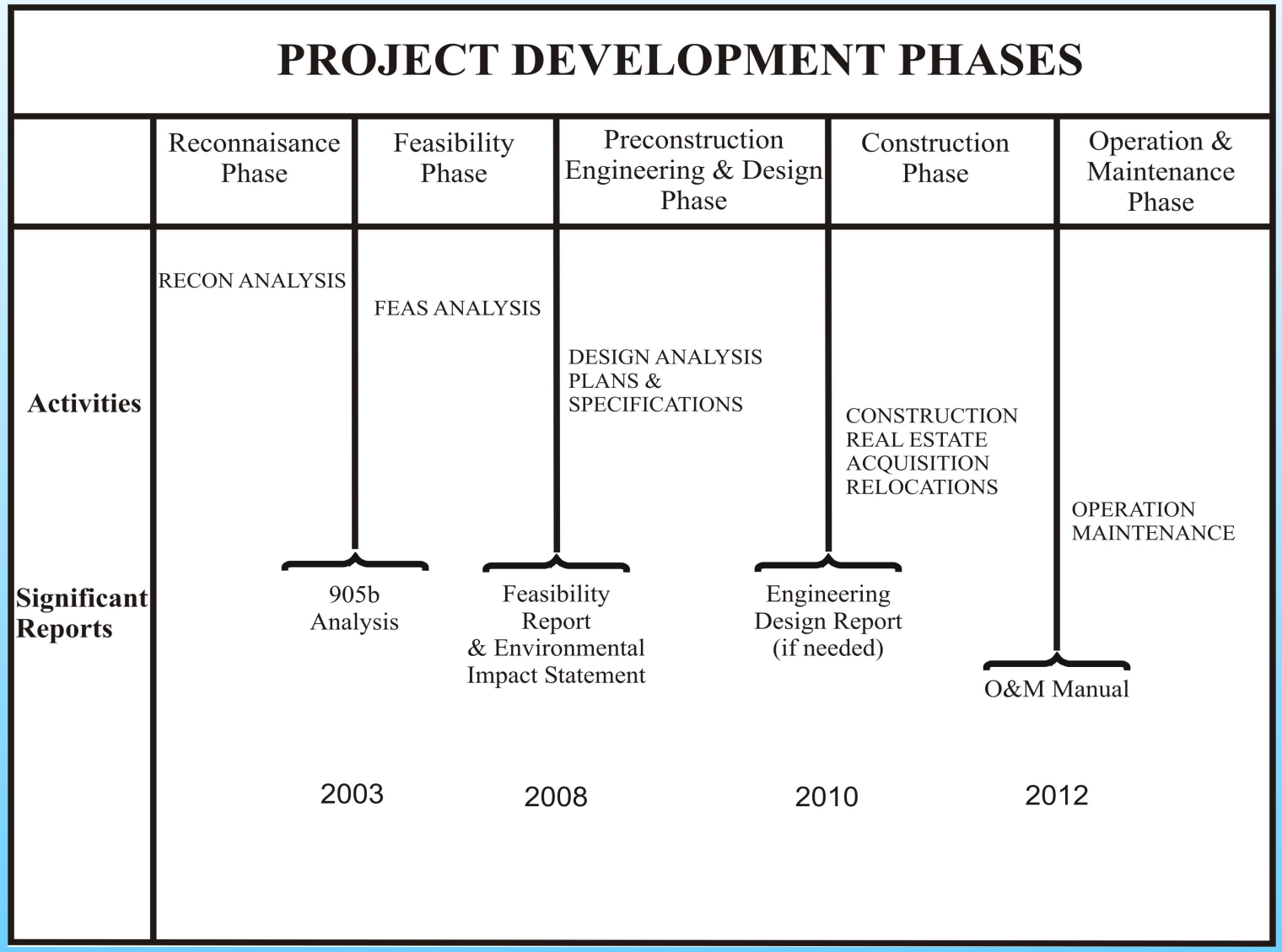
Study Background



Study Background

Feasibility Study Purpose

- **Identify existing and future conditions in the study area.**
- **Evaluate storm damage reduction measures and determine a plan that best meets the "*Principles and Guidelines*" of the Water Resources Council and other criteria. A recommended plan generally is:**
    a. **Economically justifiable**
    b. **Environmentally acceptable**
    c. **Meets policy criteria and engineering design standards**
    d. **Supported by a local government**
- **Make a recommendation to Corps Headquarters and Congress on whether to spend federal funds (in partnership with a local government) to proceed with**

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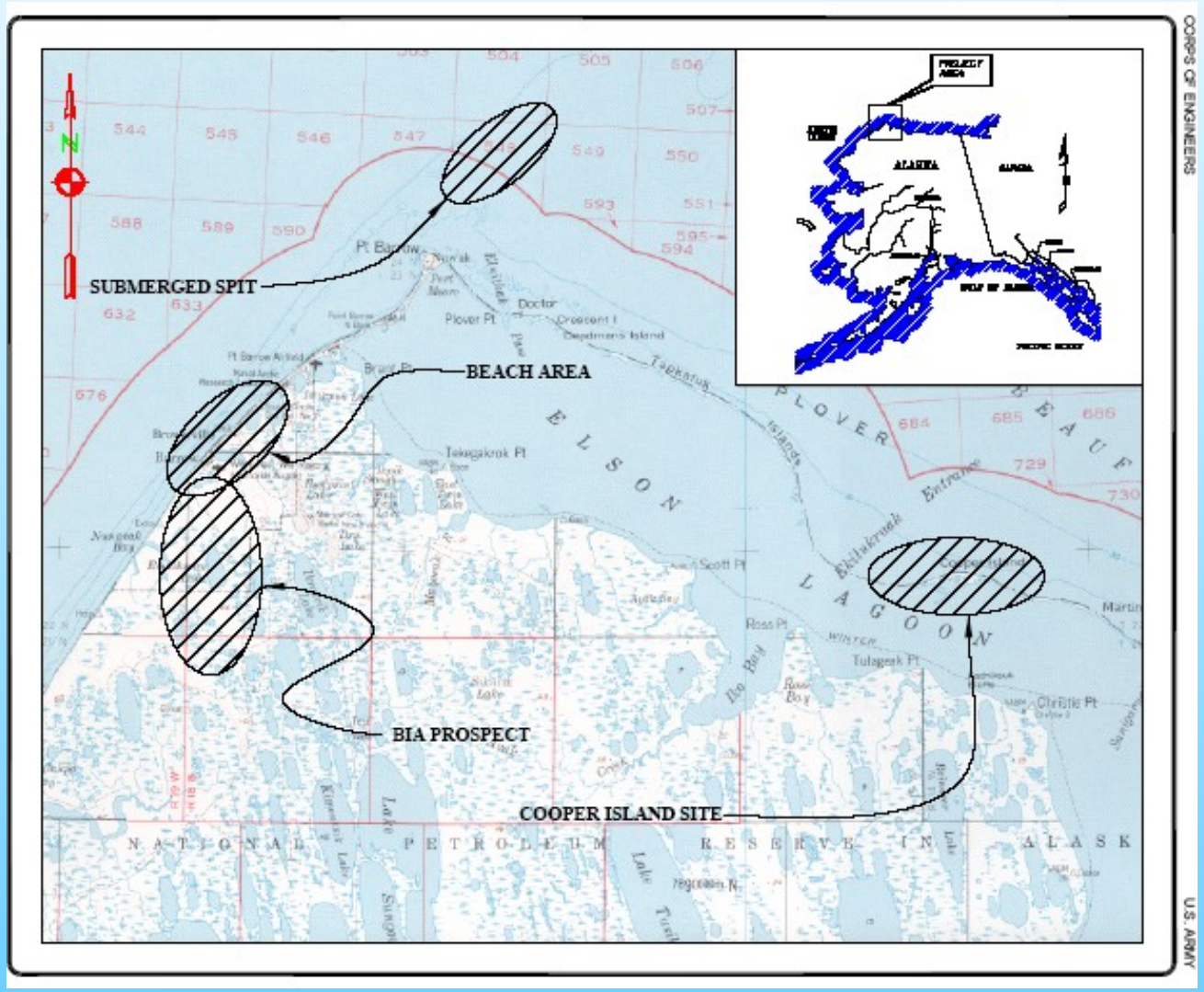
Progress to Date

Exploration Areas



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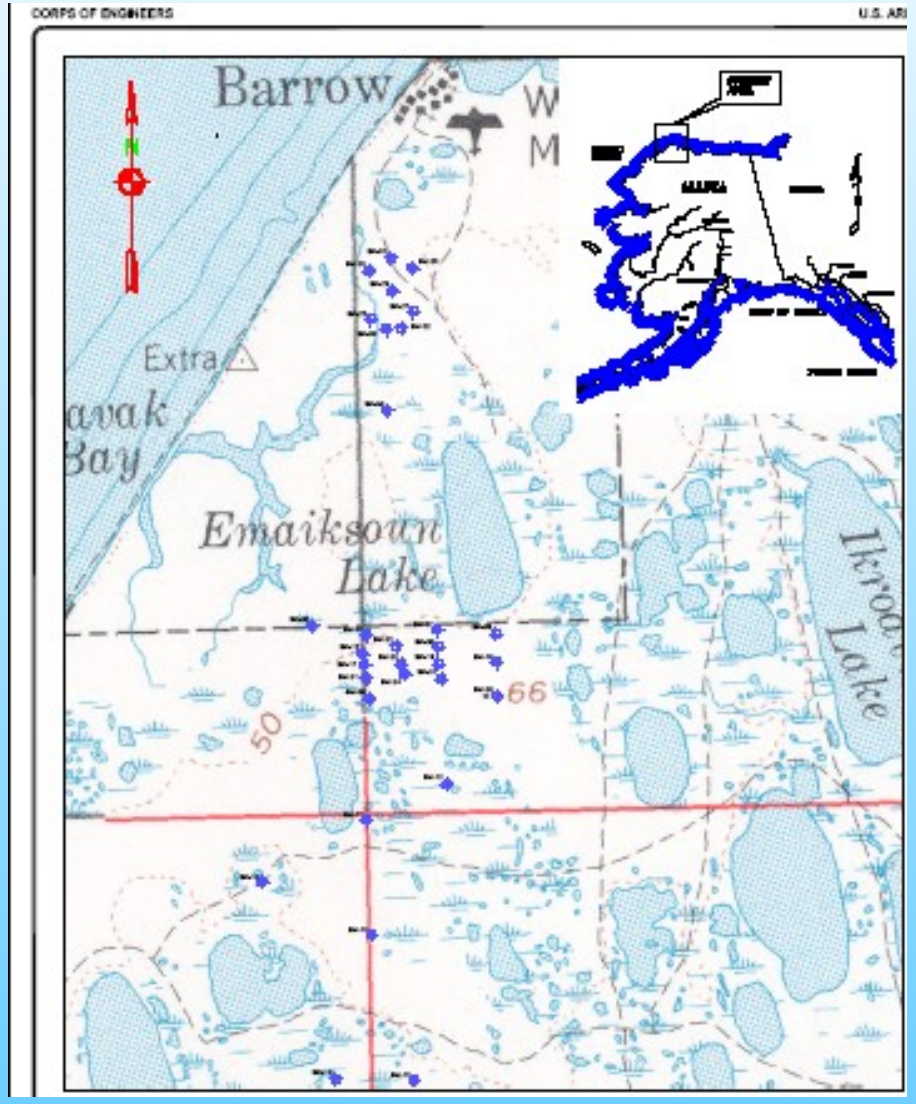
Progress to Date

BIA Borrow Site



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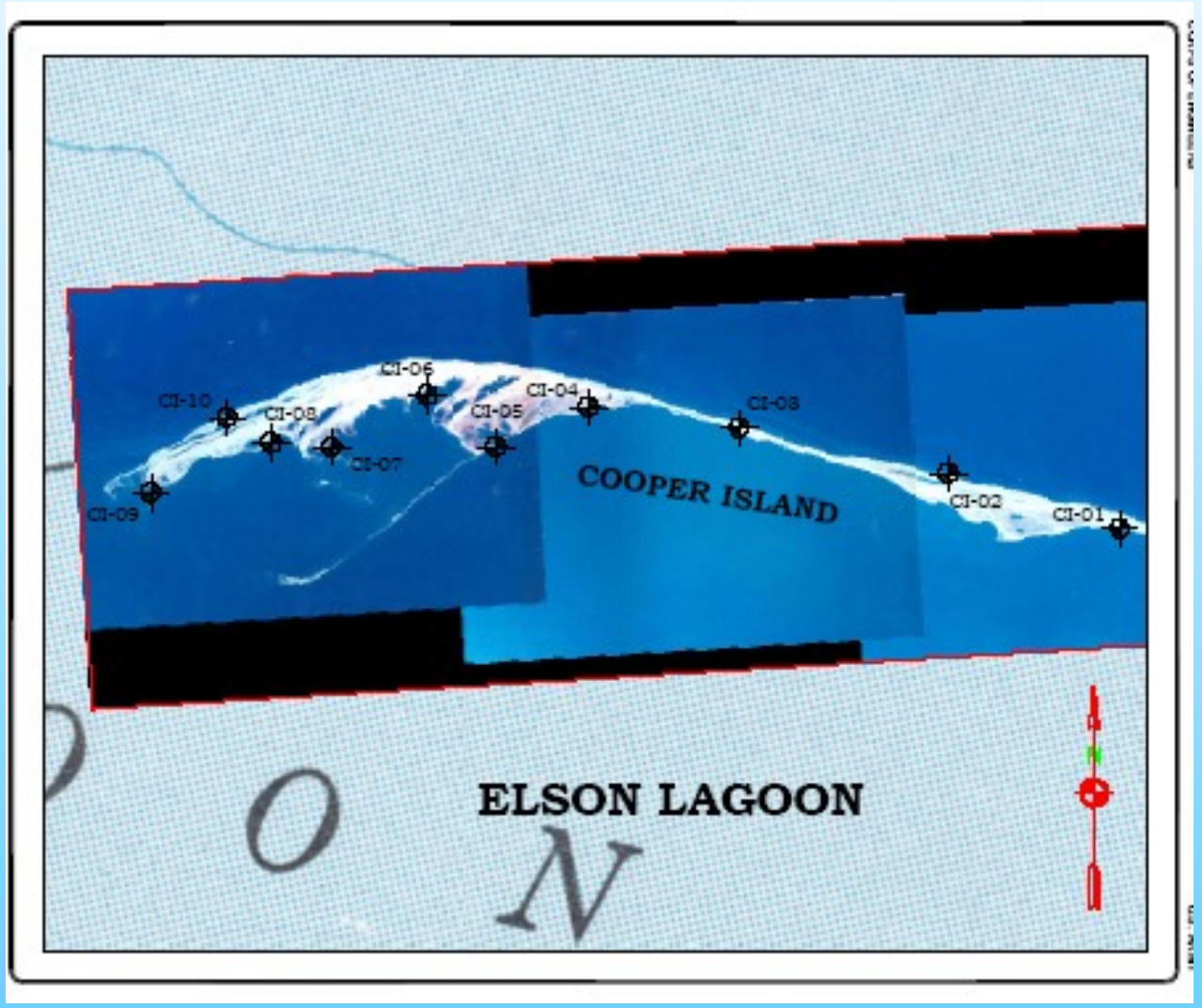
Progress to Date



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Progress to Date

Point Barrow Site

Progress to Date

Environmental Resources

- Literature search of existing environment in project areas.
- Vegetation typing at Cooper Island borrow site.
- Nearshore fish and invertebrate inventory at Barrow beach site and Cooper Island.

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Progress to Date

Cultural/Archeological Resources

- **2003–Archeological survey along access route for drill rig to BIA borrow site. No archeological sites found at BIA site.**

- **2004–Archeological survey of Cooper Island and BIA borrow sites by Barrow Technical Services.**

  - BIA site–No archeological sites found.

  - Cooper Island–Eroded house site: determined eligible

  Whale skeleton: no determination made

  Navy debris: not eligible (probably

Progress to Dat

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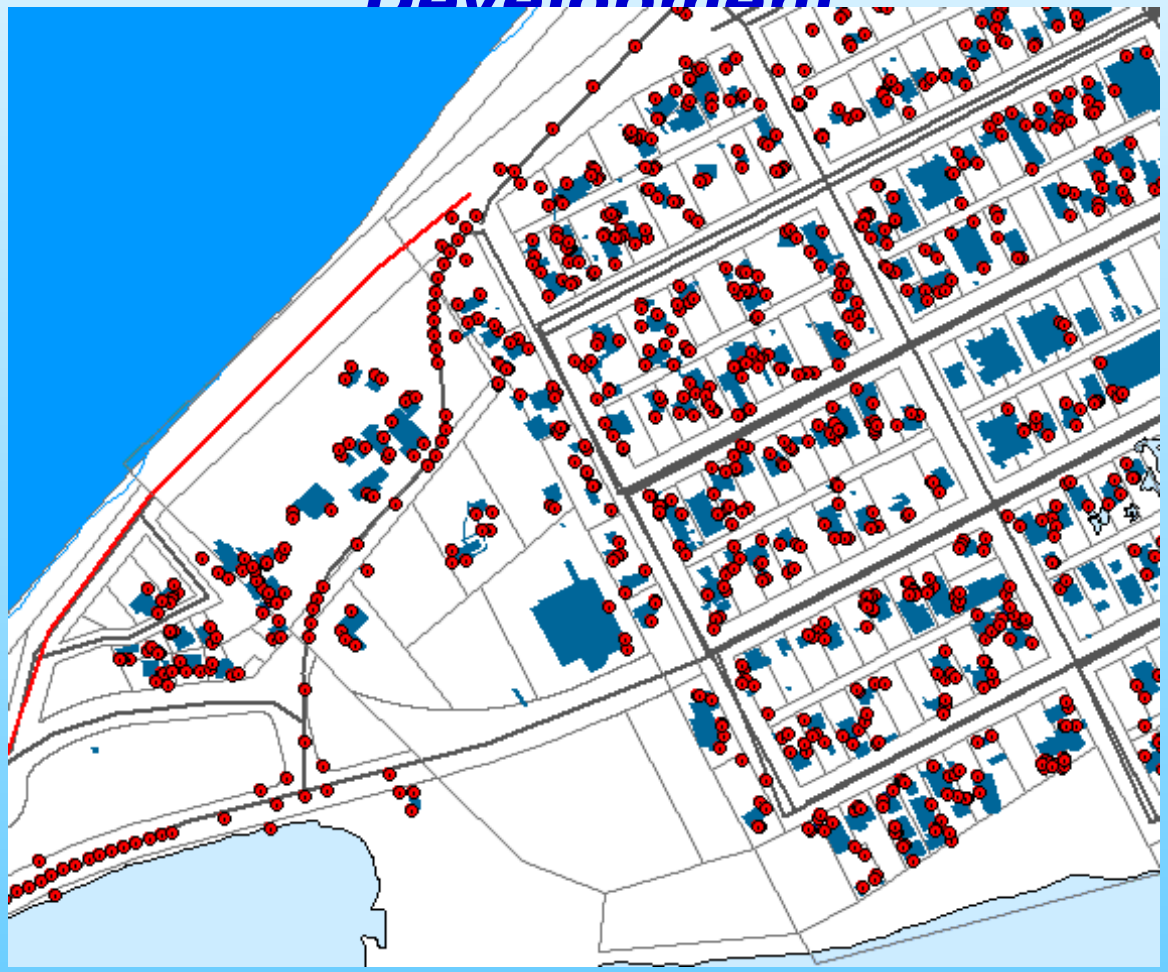
Economic Data Development

- **Without Project Condition (structures, measures, infrastructure)**
- **Elevation Surveys (ground, first floor, service barrels, road and berm profiles)**
- **Property and Content Surveys (all businesses, public, industrial, 50 random residences)**

Progress to Date

Economic Data Development



- Surveys
  - Ground
  - First Floor
  - Service Barrels

*Survey Points in red

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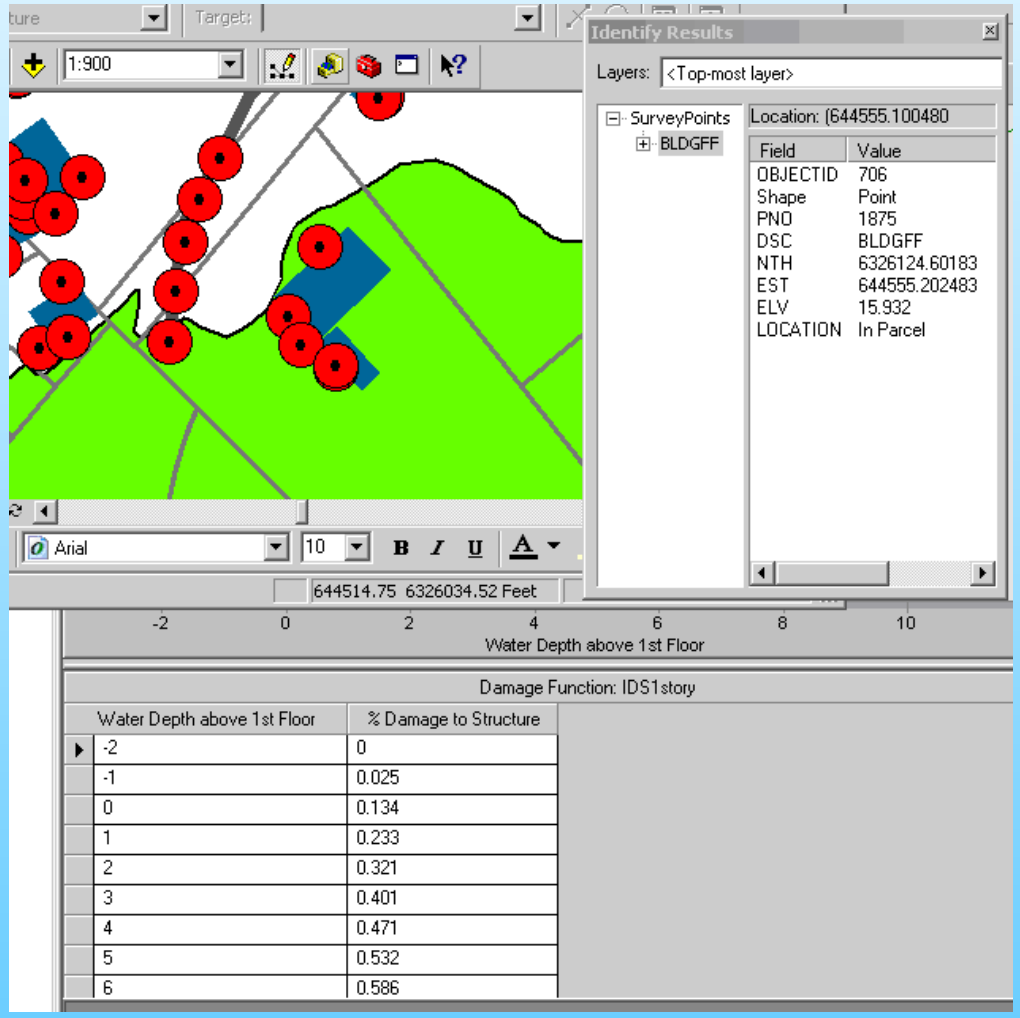
Progress to Da

Economic Data Development
Damage Analysis



Water Depth above 1st Floor	% Damage to Structure
-2	0
-1	0.025
0	0.134
1	0.233
2	0.321
3	0.401
4	0.471
5	0.532
6	0.586

First floor elevations are analyzed against the potential flooding depths to determine the percentage of damages to structures and contents.

Progress to Date

Economic Data Development

- Most properties are above the 12-foot elevation
  - Orange - 4 feet
  - Yellow - 8 feet
  - Green - 12 feet
- 1963 storm reportedly reached elevations of 11 to 12 feet.

Progress to Date

Economic Data Development

Likely Damages to Community

- **Impacts to utilities**
  - **Utilidor/Buried Utilities**
  - **Spillway Utilities**
  - **Water Supply Lagoon**
- **Secondary impacts from loss of utilities**
  - **e.g…loss of electricity leads to frozen water lines**
- **Erosion Damages**

Progress to Date

Coastal Hydraulics

- **Instrumentation—Instruments deployed Summer ’03 and ’04 (partial recovery of data from last summer)**
- **Deep Water Wave Analysis—Completed, waiting for data/report**
- **Near Shore Wave Analysis—In Progress**
- **Water Level Study—In Progress (surge complete, set up underway)**
- **Sediment Transport Study—In progress. Preliminary results indicate not as much beach transport as previously thought. Erosion may be able to be addressed by bluff protection and limited nourishment.**

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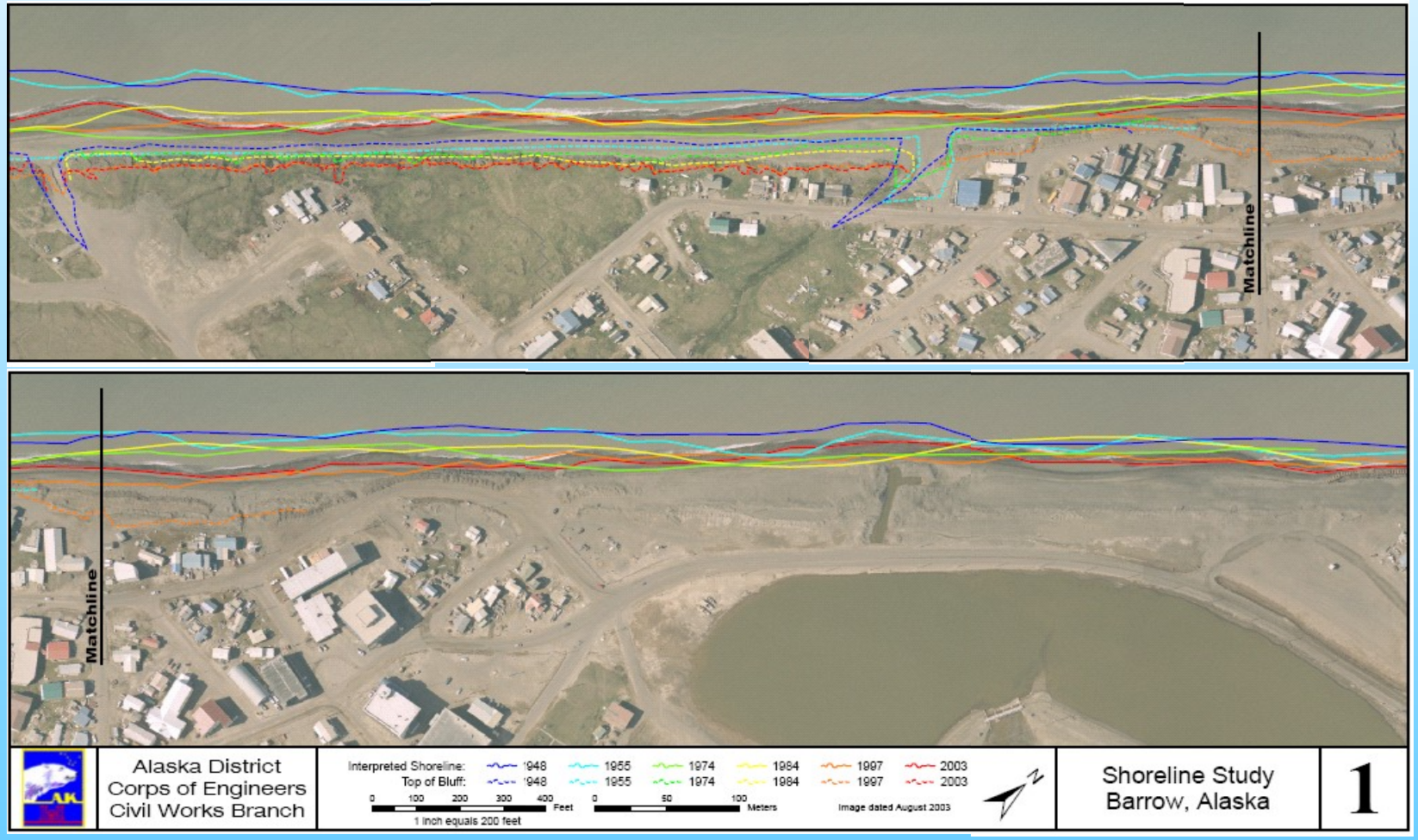
Shore and Bluff Line Change Example Analysis



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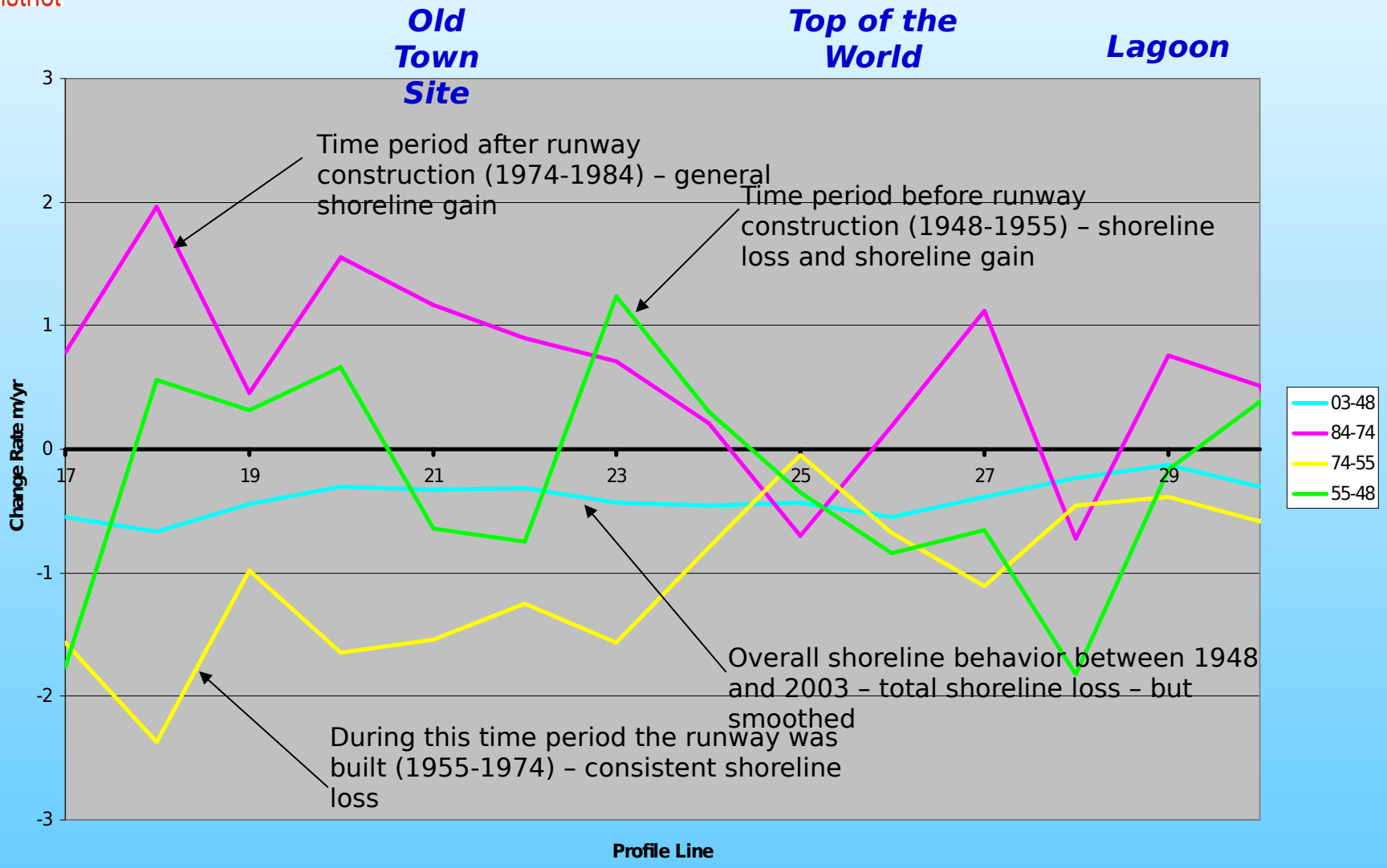
Shoreline Recession Rate Between Stations 17 and 30



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Aerial Photo Indicating Borrow from the Beach for the Airport

Information Sought

Stories, photos, recollections of where beach material was removed – and when (year).

Coastal or flood impacted elevations or topography data from before 1963 storm.

Preliminary Measur

Erosion Protection

- Revet Bluff Face
  - Supersacks
  - Articulated Mat
  - Rock Revetment
- Nourish Beach–limited locations
- Nonstructural Measures

Flood Mitigation

- Raise Roadway
- Nourish Beach—limited locations
- Nonstructural Measures

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Example of Supersack Revetment Barrow

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Example of Articulated Concrete Mat Deering

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Example of Rock Revetment Nome

Preliminary Measures & Impacts

Beach Nourishment

- **Description: Place material on the beach to reduce the impact of waves. Potential borrow sites are: BIA site, Cooper Island site, and Point Barrow site.**
- **Impacts: Bury invertebrate habitat along the beach. Temporary construction impacts include noise, dust, and interference with beach access.**

Preliminary Measures & Impa

Beach Nourishment Using BIA Borrow Site

- **Description: During winter, remove overburden and mine gravel. Haul gravel over an ice road across Freshwater Lake and existing roads to the beach, where it would be stockpiled. In summer, material would be spread along the beach.**
- **Costs: About $70/cubic yard.**
- **Impacts:**
  - **Wetlands would be impacted eliminating bird habitat, causing permafrost thermokarsting and nuisance/contact with polar bears in winter. The pit also would be an eyesore.**

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Preliminary Measures & Impa

Beach Nourishment Using Cooper Island Borrow Site

- **Description: Work would be done during open-water period. Material would be removed from lagoon side of island down to almost sea level, loaded on barges, and transported to the beach.**
- **Costs: About $75/cubic yard**
- **Impacts:**
  - **Barge route noise and disturbance impacts to marine mammals.**
  - **Potential barrier island breech consequences to nearshore brackish water habitats and potential erosion of mainland.**

Preliminary Measures & Impa

Beach Nourishment Using Cooper Island Site (cont.)

- Mining impacts to bird nesting, staging and foraging habitats, disturbance of black guillemot research station.
- Disruption of bowhead subsistence hunting area for lookout and landing whales.
- Impacts to polar bear and seal use areas.
- Impacts to cultural resources: eroded house site, whale skeleton, effect on cultural resources down the coast and in the lagoon if gravel is removed.

Preliminary Measures & Impa

Beach Nourishment Using Point Barrow Borrow Site

- **Description: Material would be loaded on trucks, transported to the beach, off-loaded on the beach and graded as required.**
- **Costs: About $48/cubic yard**
- **Impacts:**
  - **Impacts to nearshore fish, invertebrate, and shore bird habitats.**
  - **Truck traffic noise and disturbance to wildlife.**
  - **Cultural Resources Impacts: Nuvuk Historic site (National Register eligible site–has many graves, artifacts, and house remains), subsistence**

Preliminary Measures & Impa

Revetments

- **Description: Supersacks, concrete mat, rock**
- **Impacts:**
  - **Beach access impediments.**
  - **Minimal effects to vegetation habitats**
  - **Borrow source impacts**
  - **Cultural resources impacts**

Preliminary Measures & Impacts

Non-Structural Measures

- Relocate Structures/Facilities from Damage Area
- Relocate Roads to Less Vulnerable Locations
- Relocate Utilidor and/or Other Utilities
- Participate in Federal Flood Insurance Program

Planned Summer Field Work

Geotechnical Work

- Identify nearest feasible rock source that would meet Corps specifications for rock revetment measure.

Economics Work

- Contract to determine likely utility infrastructure damages and cost/time for repair.
- Social Impact Study.

Hydraulics & Hydrology Work

- Retrieve offshore instrumentation.

Planned Summer Field Work

Environmental Work

- **Continuation of nearshore fish and invertebrate inventory at Barrow Beach and Point Barrow.**
- **Bird surveys at BIA site and nearshore beaches.**
- **Vegetation and wetland delineation at BIA site.**
- **Environmental/cultural field investigations of potential rock source.**

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What Do You Think ?